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DEPARTMENT OF NATURAL RESOURCES

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Division of Oil Gas and Mining

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Division Director

Inspection Report
Minerals Regulatory Program
Report Date: May 8, 2008

Reviewed

Mine Name: Bingham Canyon Mine **Permit number:** M/035/002
Operator Name: Kennecott Utah Copper **Inspection Date:** May 5, 2008
Rohan McGowan-Jackson, Manager **Time:** 2:00 PM
Inspector(s): Beth Ericksen
Other Participants: KUCC: Denise Powers, Jerry Shepherd, Chris Kaiser, Glenn Eurick
Mine Status: Active **Weather:** Warm and partly sunny

Elements of Inspection	Evaluated	Comment	Enforcement
1. Permits, Revisions, Transfer, Bonds	☒	☒	☐
2. Public Safety (shafts, adits, trash, signs, highwalls)	☐	☐	☐
3. Protection of Drainages / Erosion Control	☐	☐	☐
4. Deleterious Material	☐	☐	☐
5. Roads (maintenance, surfacing, dust control, safety)	☒	☒	☐
6. Concurrent Reclamation	☐	☐	☐
7. Backfilling/Grading (trenches, pits, roads, highwalls, shafts, drill holes)	☐	☐	☐
8. Water Impoundments	☐	☐	☐
9. Soils	☐	☐	☐
10. Revegetation	☐	☒	☐
11. Air Quality	☐	☐	☐
12. Other	☒	☒	☐

Purpose of Inspection:

The purpose of the inspection was to view reclamation progress at the South Tailings Impoundment per the 2007 Reclamation Activities Plan commitments. The commitments included applying crushed limestone, biosolids, fertilizer and seed. Specifically:

Table 1

Reclamation Activity	2007 Planned Acres	Rate (units vary)
Limestone	180	60 ton/acre
Biosolids	100	10 cubic yds/acre
New Seed	100	-
Reseed	400	-
Polymer/dust control	-	150 gallons/acre
Supplemental Fertilizer	300	100 lb/acre

Directions: I80 West to Saltair Exit (HWY 202). Travel south over the bridge. Tailings Impoundment entrance just past the bridge on the east side of the road. Signage is obvious. Drive to the entrance and use the phone to check in with Jerry Shepherd. Go to the marked "admin building" upstairs on the west side.

Inspection Summary:

The site inspection consisted of a one-hour meeting in the admin. building followed by the South Tailings Impoundment inspection.

General Information: The south tailings area has been inactive since 2002 and encompasses about 6700 acres[1]. The impoundment is divided into reclamation segments two through five. The last active reclamation segment was location five (north east). Reclamation area three (north-central) has been reclamation compromised due to high salinity. Reclamation area four (south-central) has been a reclamation challenge because of the high acid tails that were delivered to this area. Approximately 75-80 miles of roads are located throughout the impoundment[1].

Meeting Content and Summary: C. Kaiser, J. Shepherd, G. Eurick, and D. Powers of KUCC and B. Ericksen of DOGM attended the meeting. Denise Powers was unfamiliar with DOGM regulatory requirements so an overview was provided. The discussion involved identifying the requirements and commitments under the reclamation contract (reclamation activities), annual report content, and the Groundwater Management Plan. Mr. Shepherd mentioned the seismic upgrade plan that resulted in 60-80 dewatering wells in the southeast corner of the impoundment. He said there is a 35 acre[1] repository nearby that is used for contaminated soils. The impoundment is currently being dewatered using gravity drainage.

Inspection:

The inspection was attended by Beth Ericksen, Chris Kaiser, Jerry Shepherd, and Glenn Eurick. Mr. Shepherd provided the general overview of the area. The group traveled by SUV and inspected each reclamation segment 2-5. For clarification purposes, there is no area 1.
Area two: About 30 acres were fertilized and planted in fall 2007. Mr. Shepherd said there is pretty good success so far. He indicated planting occurs in early spring with completion by the first of April. Mr. Shepherd said using rye in the mix has a dust and erosion control benefit. Cattle were grazing in the area.
Area three: This section had a high salinity content so has been a challenge to stabilize. Mr. Shepherd expressed that it took about three years to attain stabilization and as shown in photo 12, the wheat grass is about 3-years old.
Area four: This segment is high in acidity resulting in a specific reclamation plan. Limestone is applied one year before planting. A portion of this area was planted in spring 2008 as shown in photo #8. Lime was applied in 2006 prior to the spring 2008 planting. Mr. Kaiser indicated that one of the lessons learned is to effectively manage the operations so that tailings success can be achieved with reduced effort. He said it was a complex process, but to ultimately produce better tailings for successful reclamation is important. Mr. Shepherd explained that a 5-acre test plot was established to test the use of hydrate lime. He indicated it brought the pH up by one. Because it reacts quickly, they will mix with the 'slower release' limestone.
Area five: This north-east section (5E) is the last to dry-out. The area was the last to receive tails, contains slimes, and a shallow depth pond remains. Mr. Shepherd believes it will dry-out in the next two years and the barge can be removed. Birds were seen (photo 11). Mr. Shepherd said the variety of wildlife he's observed are: mice, fat squirrels, skinny raccoons, muskrat, deer, coyote, burrowing owls (but not seen for 2-years), and in '07 a Great Blue Heron. At the south end of segment five, Mr. Shepherd said a one-time seeding occurred about 3 yrs. ago and he considered the revegetation successful (see photo 9).

Mr. Shepherd said EPA encouraged using the South Tailings location as a solar panel site.

Conclusions and Recommendations:

During the meeting, Ms. Ericksen suggested that KUCC submit a map with the reclamation activities plan that includes all reclamation activities and not just seed application areas. This request applies to the annual report as well. When KUCC submits information it should be comprehensive for both the 'planned' activities and the 'actual' activities. Ms. Powers said she submits a report to Air Quality that includes this information and was hoping the Division could accept the same report. She will send a copy of a recent report to Ms. Ericksen to determine if it will satisfy DOGM's need for this information.

A KUCC email dated December 6, 2007 provided the following information:

Table 2

Reclamation Activity	2007 Actual Acres	Rate (units vary)
Limestone	310	32.5 ton/acre
Biosolids	282	6 cubic yds./acre
New Seed	90	-
Reseed	466	-
Polymer/dust control	-	141 gallons/acre
Supplemental Fertilizer	247	99 lb./acre

As seen on the table 2, the actual work does not equal the planned work for 2007 (table 1). Ms. Ericksen indicated the importance of providing updates to the Reclamation Activities Plan as changes occur to minimize discrepancies between planned and actual work performed. It should be easy to identify activities and locations when an inspection is performed.

In the future, KUCC should provide a map showing the activity and location of the various reclamation activities with acres. The Division wants to see the proposed plan outline on a map (identify activity, location, acres, and dates) as part of the Reclamation Activities package and the same map in the annual report showing actual work.

The Division would like a map that shows the location of the dewatering wells. KUCC Figure 10-3, approved by DOGM June 11, 2003 should be updated to include this information and incorporate any changes since its creation in 2002. Furthermore, the Division would like information about the repository since there isn't an explanation of it in the plan.

In the 2007 Planned Reclamation Activities Plan KUCC did not include an 'experimental technology' section. Please include this section in the future. Mr. Shepherd indicated that he had performed a study using quicklime, however, this study outline was not included in the 2007 submittal.

The fact the KUCC is looking at operations practices to minimize acidification of tailings for successful reclamation is important. The Division suggests that KUCC address this effort in greater detail as it encompasses their commitment to their experimental work program.

There was a discussion about post mining land use and Ms. Ericksen suggesting they compile a planting progression map showing seed/reseed dates.

Ms. Ericksen encouraged KUCC to update the tailings portion of the 2003 Groundwater Management Plan.

Roads were well maintained. They are ditched on one side and bermed on the other. Magnesium chloride is used as a dust control measure. Mr. Shepherd said KUCC spent about $250,000 on mag-chloride last year. The south impoundment area revegetation effort has been met with challenges and new learning experiences. It is apparent that Mr. Shepherd and his team are attentive to this area. With their dedicated effort and willingness to implement standards and new ideas, they increase their chances for reclamation success.

Inspector's Signature _____ **Date:** 05.07.08

BE:be
cc: KUCC, Mr. Chris Kaiser, kaiserc@kennecott.com
Beth Ericksen, DOGM
Attachment: Photo pack, 12 photos, cover "Photo Gallery"

1-KUCC

Photo gallery M1035002

photo1.JPG

Area 2

photo2.JPG

Area 4A

photo3.JPG

Area 3B

photo4.JPG

Area 4B

photo5.JPG

Area 4A

photo6.JPG

Area 4A

photo7.JPG

Area 4D

photo8.JPG

Area 4D

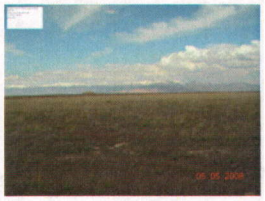

photo9.JPG

Area 5A

photo10.JPG

Area 5E

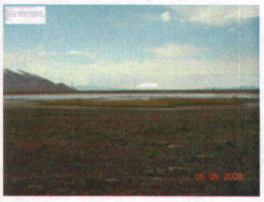

photo11.JPG

Area 5E

photo12.JPG

Area 3C

date: May 5, 2008

location: South Tailing Impoundment

Inspection

M/035/002 South Tailings Impoundment

Photo #1 Area 2

Photo #2 Area 4A

M/035/002 South Tailings Impoundment

Photo #3 Area 3B

Photo #4 Area 4B

M/035/002 South Tailings

Photo #5 Area 4A

Photo #6 Area 4A

M/035/002

South Tailings

Photo #7

Area 4D

Photo #8

Area 4D

P64

M/035/002

South Tailings

Photo #9

Area 5A

Photo #10

Area 5E

M/035/002

South Tailings

Photo #11

Area 5E

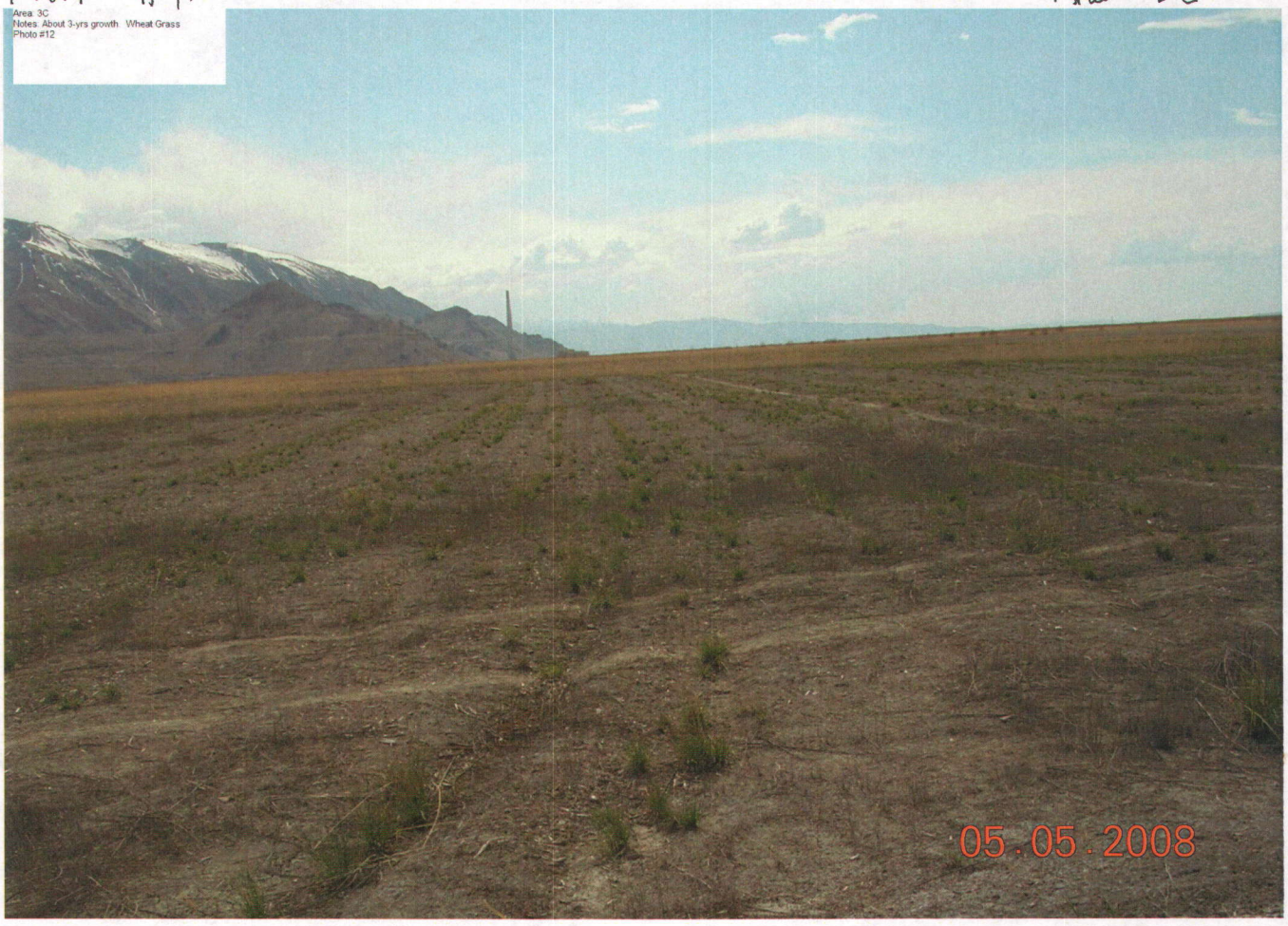

Photo #12

Area 3C

P66